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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/688,525	10/16/2000	Clifford A. Henricksen	02103-393001	3066

26161 7590 09/30/2003
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EXAMINER

MICHALSKI, JUSTIN I

ART UNIT	PAPER NUMBER
2644	

DATE MAILED: 09/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/688,525	Applicant(s) HENRICKSEN ET AL.	
	Examiner Justin Michalski	Art Unit 2644	

NO DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM

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- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

1) ☒ Responsive to communication(s) filed on 16 October 2000.

- ## Disposition of Claims

- ## Application Papers

- Priority under 35 U.S.C. §§ 119 and 120

- a) ☐ All b) ☐ Some * c) ☐ None of:

- * See the attached detailed Office action for a list of the certified copies not received.

- Attachment(s)**

- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claim 11 is rejected under 35 U.S.C. 102(b) as being anticipated by Selby (US Patent 4,940,108). Selby discloses a loudspeaker system, comprising: a first portable array module comprising a portable enclosure and at least six acoustic drivers positioned in said enclosure in a substantially straight line (Figure 1); a second portable array comprising a second portable enclosure and a plurality of acoustic drivers positioned in a substantially straight line (Selby discloses a separate stacked module, i.e. second array) (Column 3, lines 61-62); and an attachment system for attaching said first portable array to said second portable array in a manner so as to extend said substantially straight line (Selby discloses stacking (i.e. attaching) separate modules varying the height of the speaker) (Column 3, lines 57-62).

3. Claim 19 is rejected under 35 U.S.C. 102(b) as being anticipated by Ferren (US Patent 5,802,190). Ferren discloses a loudspeaker system for a public facility having a listening area (Figure 1, reference 18), said listening area having a floor and an intended listening height range above said floor (listening range up to a height of about

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8 feet) (Column 4, lines, 15-18), said loudspeaker system comprising: a line loudspeaker array having a top and a bottom comprising a plurality of acoustical drivers array in a substantially straight line connecting said top and said bottom (Figure 2), with top and said bottom defining planes perpendicular to sides, wherein said array is dimensioned and positioned such that said intended listening height lies between top and bottom plane of system such that said bottom is substantially in the vicinity of said floor (Ferren discloses the height of the enclosure should span the range of ear heights of any potential group of listeners) (Column 4, lines 10-14).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ferren (US Patent 5,802,190) in view of Russell (US Patent 4,267,405).

Regarding Claim 1, Ferren discloses a loudspeaker system, comprising: a first loudspeaker array comprising an enclosure having a width and a height and at least six acoustic drivers having radiating surfaces (Ferren discloses an embodiment with more than 6 speakers) (Figure 2; Column 5, lines 35-37), wherein drivers are positioned in the enclosure in a first substantially straight line, substantially regularly spaced so that the edges of radiating surfaces are less than two inches apart (Ferren discloses separation

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being ½ inch) (Column 5, lines 37-39) , and array is constructed and arranged to radiate sound in a predetermined frequency range (Ferren discloses the full frequency range being coupled) (Column 2, lines 10-13). Ferren does not disclose the drivers having a diameter less than three inches. Russell discloses a speaker system with an array of drivers. Russell discloses prior art including a columnar speaker assembly including six 1½ inch dome drivers (Column 2, lines 4-7). Both Ferren and Russell disclose columnar speaker systems for radiating sound over a desired area. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to use a speaker with a diameter less than three inches since it is known in the art that a speaker less than three inches is also capable of radiating sound over a desired area.

Regarding Claim 9, Ferren further discloses the diameter (i.e. width) of the speaker enclosure is six inches (Column 4, lines 6-7) and the speakers can be disposed within a height eight feet (Column 4, lines 15-18) producing a height to width ratio of $(8 \text{ feet} * 12 \text{ inches}) / 6 \text{ inches} = 16$ which is greater than 11.

6. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ferren as modified as applied to claim 1 above, and further in view of Pawlowski (US Patent 3,125,181). As stated above apropos of claim 1, Ferren as modified makes obvious all elements of that claim. Ferren as modified does not disclose an electrical circuit which provides essentially the same audio signal to all of the acoustical drivers at all frequencies. Pawlowski discloses a loudspeaker system where each acoustical driver is provided with the same audio signal (Figure 3). Therefore, it would have been

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obvious to one skilled in the art at the time the invention was made to use circuitry that provides all drivers with the same audio signal in order to provide the same signal to all drivers of a speaker array for a uniform output.

7. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ferren as modified as applied to claim 1 above in view of Azima et al. (US Patent 6,215,881).

As stated above apropos claim 1, Ferren as modified makes obvious all elements of that claim. Ferren as modified does not disclose the loudspeaker is constructed to transducer to acoustical energy substantially at least 7 watts of electrical energy per square inch of radiating surface. Azima et al. discloses a 25mm transducer driven by 40 watts that is bonded to a ceiling tile as a resonator. If the ceiling tile were two inches by two inches the speaker system would transduce $40W/(2in \times 2in) = 10W/in^2$.

Therefore it would have been obvious to one skilled in the art at the time the invention was made to decrease the size of the speaker in order to obtain at least seven watts of electrical energy per square inch of radiating surface.

8. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ferren as modified as applied to claim 1 above further in view of Pitre (US Patent 4,031,318). As stated above apropos of claim 1, Ferren as modified makes obvious all elements of claim 1. Ferren as modified does not disclose the loudspeaker system radiating at least six octaves. Pitre discloses an ideal loudspeaker having a frequency response from about 10Hz to about 25kHz (which encompasses at least 6 octaves) (Column 2, lines 60-

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64). Pitre teaches an ideal loudspeaker has a frequency response that overlaps the input response of the ear. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the speaker as disclosed by Ferren as modified with a frequency response of at least six octaves in order to produce a wide frequency response that may come close to or overlap the response of the ear to produce a higher fidelity audio signal.

9. Claims 3-5, and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ferren as modified as applied to claim 1 above, and further in view of Selby (US Patent 4,940,108).

Regarding Claim 3, as stated above apropos of claim 1, Ferren as modified makes obvious all elements of that claim. Ferren as modified does not disclose a second loudspeaker array which is constructed and arranged to be attached to first loudspeaker increasing height while width remains constant. Selby discloses a line source speaker system where the height of the speaker can be modified using several stacked modules (Column 3, lines 57-62). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to connect a second loudspeaker array in order to increase the height of the loudspeaker.

Regarding Claim 4, as stated above apropos of claim 3, Ferren as modified makes obvious all elements of that claim. Selby further discloses a loudspeaker with a height of 12 feet and width of 7 inches (Column 3, lines 57-66) producing a height to width ratio of $(12 \text{ feet} * 12 \text{ inches}) / 7 \text{ inches} = 20.57$ which is greater than 20.

Regarding Claim 5, as stated above apropos of claim 3, Ferren as modified makes obvious all elements of that claim. Selby further discloses a method for extending the vertical height by stacking modules (i.e. attaching first loudspeaker array to second loudspeaker array) (Column 3, lines 57-62).

Regarding Claim 7, as stated above apropos of claim 3 Ferren as modified makes obvious all elements of that claim. Russell further discloses a speaker system to be used for home or similar use (i.e portable) (Column 2, lines 53-59).

10. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ferren as modified as applied to claim 3 above, and further in view of Pawlowski (US Patent 3,125,181). As stated above apropos of claim 3, Ferren as modified makes obvious all elements of that claim. Ferren as modified does not disclose circuitry which provides essentially the same audio signal to all of said acoustical drivers in both of said loudspeaker arrays at all frequencies. Pawlowski discloses a loudspeaker system where each acoustical driver is provided with the same audio signal (Figure 3). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to use circuitry that provides all drivers with the same audio signal in order to provide the same signal to all drivers of a speaker array for a uniform output.

11. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Selby (US Patent 4,940,108) in view of Ferren (US Patent 5,802,190) and Russell (US Patent 4,267,405). Selby discloses a loudspeaker module, comprising: a portable enclosure

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having an attachment system for attaching said module to a second module (Selby discloses modules can be stacked for certain applications) (Column 3, lines 59-52); and at least six acoustic drivers having a radiating surface (Figure 1), the drivers positioned in the enclosure in a straight line regular spaced; and loud speaker array constructed and arranged to radiate sound over essentially the full range of the audible frequency spectrum (Selby discloses operation through all frequencies of sound) (Column 2, lines 4-6). Selby does not disclose the spacing of the speakers as less than one inch apart or with a diameter less than three inches. Russell discloses drivers on a columnar speaker with a size of 1½ inches (Column 2, lines 4-7). Ferren discloses spacing of speakers on a linear speaker array as being ½ inches between adjacent speakers (Column 5, lines 37-39). Ferren teaches speakers should be located as close as possible to enhance directionality (Column 5, lines 32-35). Both Selby and Russell disclose columnar speaker systems for radiating sound over a desired area. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to use a speaker with a diameter less than three inches since it is known in the art that a speaker less than three inches is also capable of radiating sound over a desired area and to use less than one inch between speakers to enhance directionality as taught by Ferren.

12. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Russell (US Patent 4,267,405) in view of Ferren (US Patent 5,802,190). Russell discloses a method a method for improving the number of electrical watts transducer per unit

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radiating area of a line array loudspeaker comprising: mounting in a straight line a plurality of acoustic drivers (Figure 4), each of the acoustic drivers having a diameter of less than three inches and each of the acoustic drivers having a radiating surface having an edge (Russell discloses a columnar arrangement of $1\frac{1}{2}$ speakers) (Column 2, lines 4-6). Russell further discloses the use of multiple speakers increases the dynamic range of the speaker (i.e. watts per unit area) (Column 8, lines 1-5). Russell does not disclose placing the acoustic drivers so that the edges of the radiating surfaces of adjacent acoustic drivers are separated by no greater than one inch. Ferren discloses a linear speaker array where spacing between adjacent speakers is $\frac{1}{2}$ inch (Column 5, lines 39-42). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to combine the linear speaker system as disclosed by Russell with the spacing of speakers taught by Ferren in order to increase the watts transduced per unit radiating area.

13. Claims 14-18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ferren (US Patent 5,802,190) in view of Russell (US Patent 4,267,405).

Regarding Claim 14, Ferren discloses a loudspeaker system for a live source of sound comprising (Figure 1 discloses use as a public address system): a line array loudspeaker comprising a line array plurality of acoustic drivers (Figure 2), each of the acoustic drivers positioned in an enclosure in a straight line less than 1 inch apart (Ferren discloses spacing between adjacent speakers being $\frac{1}{2}$ inch) (Column 5, lines 32-52) the line array being constructed and arranged to be placed in the near vicinity of

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the live source of sound facing an audience (Ferren discloses announcer in vicinity of loudspeakers used in public address system such as in Figure 1). Ferren does not disclose the speakers having a diameter less than three inches. Russell discloses a speaker system with an array of drivers. Russell discloses prior art including a columnar speaker assembly including six 1½ inch dome drivers (Column 2, lines 4-7). Both Ferren and Russell disclose columnar speaker systems for radiating sound over a desired area. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to use a speaker with a diameter less than three inches since it is known in the art that a speaker less than three inches is also capable of radiating sound over a desired area.

Regarding Claim 15, as stated above apropos of claim 14, Ferren as modified makes obvious all elements of that claim. Ferren further discloses a sound delivery system to be used as a public address system in numerous places and situations and/or playing background music or the like which could include vocalist musical performer and presenting entity (Column 1, lines 9-12).

Regarding Claim 16, as stated above apropos of claim 15, Ferren as modified makes obvious all elements of that claim. Ferren further discloses a sound delivery system to be used as a public address system in numerous places and situations and/or playing background music or the like which could include a plurality of performers (Column 1, lines 9-12), loudspeaker system comprising a plurality of line arrays (Figure 1; references 10, 12, 14, and 16), line arrays having a plurality of acoustic drivers (Figure 2), plurality of drivers positioned in enclosure in a straight line regularly spaced

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less than one inch apart (Ferren discloses spacing adjacent speakers as $\frac{1}{2}$ inch) (Column 5, lines 37-39), each line array being constructed and arranged to be placed in the vicinity of one of said plurality of performers (Ferren discloses announcer in vicinity of loudspeaker) (Column 1, lines 53-55). Russel further discloses columnar arrangement of speakers having a size of $1\frac{1}{2}$ inches (Column 2, lines 4-5).

Regarding Claim 17, as stated above apropos of claim 14 Ferren as modified makes obvious all elements of that claim. Ferren further discloses the live source as an announcer (i.e. orator) (Column 1, lines 53-57).

Regarding Claim 18, as stated above apropos of claim 14 Ferren as modified makes obvious all elements of that claim. Ferren further discloses an announcer (i.e. live source) walks back and forth in front of his or her audience at time approaching any one of the arrays (i.e. announcer is between arrays and audience) (Column 3, lines 19-23).

14. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ferren as applied to claim 19 above in view of Brown, Sr. et al. As stated above apropos of claim 19 Ferren make obvious all elements of that claim. Ferren does not disclose a loudspeaker where the floor is raked and loudspeaker array is oriented such that said line is tilted from the vertical. Brown, Sr. et al. discloses a speaker enclosure which can be tilted from the vertical (Figure 3). Brown, Sr. et al. teaches a guitar player on a chair (i.e. raked floor) hear better with the enclosure tilted upward (from the vertical) as apposed to the sound traveling in a horizontal direction in relation to the ground.

Therefore, it would have been obvious to one skilled in that art at the time the invention was made to orientate the loudspeaker tilted from the vertical in order to provide to provide listeners with a more direct and accurate audio signal.

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Clinton (US Patent 4,042,778). Clinton discloses a method of attaching two multi speaker arrays.

Klepper (US Patent 3,299,206). Klepper discloses same signal to line array of speakers.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Justin Michalski whose telephone number is (703)305-5598. The examiner can normally be reached on 8 Hours, 5 day/week.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bill Isen can be reached on (703)305-4386. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)305-3900.

JIM



**XU MEI
PRIMARY EXAMINER**